

STATUS OF THE GENUS
CYMOPHORA (COMPOSITAE)¹

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The genus *Cymophora* was founded by Robinson (1907) as a monotypic Mexican member of the tribe Heliantheae. He suggested that it shared many characters with, and appeared to stand near *Eleutheranthera*. The latter was placed in the subtribe Verbesininae by Hoffmann, (1894) and considered distinct from *Aspilia* only in that the asexual marginal florets are lacking or aborted-ligulate. While reviewing various Mexican genera of Compositae, we noted a considerable resemblance between *Cymophora pringlei* and members of the subtribe Galinsoginae, especially certain species of *Tridax*. A detailed comparison (Table 1) of the species with *Eleutheranthera* indicates that these taxa differ strikingly in almost all structures utilized for generic classification in the Compositae, such as the inflorescence, receptacle, phyllaries, pales, anthers, style branches, and achenes. On the other hand, it is so similar to *Tridax* (particularly to *T. accedens*) that there is no basis for retaining it as a separate genus. The following new name is thus required.

Tridax oligantha Anderson & Beaman, nom. nov.

Cymophora pringlei Robins. Proc. Amer. Acad. 43: 39. 1907, non *Tridax pringlei* Robins. & Greenm. Proc. Amer. Acad. 32: 4. 1896. Type: MEXICO. GUERRERO: Iguala Canyon, 2500 ft, 22 Sept. 1905, C. G. Pringle 10068 (GH, holotype, MSC photo 6732!; MICH, MSC, US, isotypes).

Erect or suberect annual 1.2-4 dm high; stems rather densely pilose and glandular, branched at each node, the principal internodes 6-9 cm long, branches arcuate or flexuous; leaves opposite, the lower on petioles to 1.5 cm long, the upper subsessile, blades broadly lanceolate to ovate, slightly acuminate, green above, paler below, hirtellous

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TABLE 1. Important features of *Tridax oligantha*, *T. accedens*, *T. dubia*, and *Eleutheranthera ruderalis*.

<i>Tridax oligantha</i>	<i>Tridax accedens</i>	<i>Tridax dubia</i>	<i>Eleutheranthera ruderalis</i>
Inflorescence cymose	Inflorescence cymose	Inflorescence cymose	Heads borne singly in the leaf axils
Receptacle conical, sparsely pilose, knobbed	Receptacle conical, glabrous, knobbed	Receptacle conical, glabrous, knobbed	Receptacle slightly rounded, permanently paleaceous, glabrous, fairly smooth
Phyllaries 6, obovate, convex, margins scarious, 4-8-nerved, glandular	Phyllaries ca 10, obovate, convex, margins scarious, 4-8-nerved, glabrous to sparsely pilose and glandular	Phyllaries ca 5, broadly ovate to suborbicular, convex margins narrowly scarious, ca 10-nerved, moderately to densely pilose and glandular	Phyllaries 6, narrowly ovate, flat, margins herbaceous, 3-nerved, moderately long-pilose and sessile-glandular
Pales membranaceous, lanceolate-oblong, convex to slightly keeled, 3-5-nerved, deciduous before the phyllaries	Pales membranaceous, broadly oblanceolate, obtuse, convex, 5-nerved, deciduous before the phyllaries	Pales membranaceous, oblong-obovate, sub-truncate with a small apiculate apex, convex, 7-nerved, deciduous after the phyllaries	Pales membranaceous below, with herbaceous apiculate apices, oval, convex, 3-nerved, persistent
Heads homogamous, involucre very narrowly campanulate, ca 4 mm high	Heads homogamous, involucre campanulate, ca 4-5 mm high	Heads heterogamous, involucre broadly campanulate, 4-5 mm high	Heads homogamous, involucre campanulate, 5-6 mm high
Florets 10, weakly bilabiate	Florets 30-40 weakly bilabiate	Ray florets 5, disk florets 30-40	Florets 8-10, tubular
Anthers 1.8 mm long, connate, appendages triangular	Anthers 2 mm long, connate, appendages triangular	Anthers 2 mm long, connate, appendages deltoid-ovate	Anthers 0.9 mm long, separate, appendages rounded and scarcely delimited

- Achenes black, 2.1-2.3 mm long, narrowly obconical, the outer densely villous, the inner less densely pubescent to glabrate, 5-angled
- Achenes black, ca 2 mm long, narrowly obconical, ray achenes moderately pilose, disk achenes glabrate, 5-angled
- Achenes black, ca 2 mm long, turbinate, 3-4-ribbed, sparsely pilose, with warty projections on and between the narrowly winged margins, apex with a mammiform, short-pilose, tubular callous ca 0.7 mm long
- Pappus absent
- Pappus of ca 20 ciliate scales, in the outer florets 0.5-0.7 mm long, in the inner ca 1 mm long, linear-lanceolate
- Pappus of 10 ciliate scales, in the ray florets ca 1 mm long, in the disk florets ca 1.5 mm long, broadly lanceolate
- Pappus absent

above and below, 3-nerved from 1-2 mm above the mostly broadly rounded, short-acuminate base, 2-5.5 cm long, 1-3.8 cm wide, margins subentire to serrulate, ciliate; inflorescence a much-branched, many-headed cyme, pedicels 1-2 cm long, filiform, pilose and glandular, the glands reddish on long stalks; heads very narrowly campanulate, homogamous, 10-flowered, 6 mm high, 3-3.5 mm wide; receptacle conical, pilose, knobby, 1 mm wide, ca 0.8 mm high; involucre 2.5-3 mm wide, 4 mm high, phyllaries 6, pilose and glandular, green below, purplish above and near the scarious margins, convex, obovate, 4-8-nerved, striate, 2.5-(outer 1 or 2) 4 mm long, 1-2 mm wide, apex obtuse and somewhat lacerate-apiculate, tardily deciduous; pales ca 7, membranaceous, lanceolate-oblong, 3.8-4 mm long, 0.7-1.2 mm wide, rather obtuse to acuminate-apiculate, subentire, glabrous, convex to slightly keeled, 3-5-nerved, deciduous; ligulate florets absent; outer disk florets 5, corollas minutely glandular and pilose on the purplish tube, minutely pilose near the tips of the white lobes, papillose on the margins, 4 mm long, tube 0.5 mm long, throat 1.8 mm long, the three larger, outer lobes 1.5 mm long, 0.7 mm wide, broadly lanceolate, the 2 smaller, inner lobes 1 mm long, 0.5 mm wide, triangular; inner disk florets 5, similar to the outer but the corollas 3-3.5 mm long with nearly equal lobes; anthers connate, 1.8 mm long, purplish, appendages triangular, bases sagittate; style branches 0.8-1 mm long, elongate, recurved, acuminate-appendiculate; achenes black, narrowly obconical, 2.1-2.3 mm long, 0.6-0.9 mm wide, apex with a low callous ring 0.05 mm high, the outer achenes slightly laterally compressed, densely villous with whitish trichomes (when dry appearing wing-like on the margins) which extend pappus-like from the outside of the apical callous ring, the inner achenes 4-5-angled with the trichomes concentrated on the margins of the inner surface and at the apex, less densely pubescent than the outer.

Additional specimens examined. MEXICO. GUERRERO: 10 mi by gravel road from Tixtla to Chilapa in the arid mts E of Chilpancingo, *Melchert & Sorensen 6145* (IA);

Iguala Canyon, 3000 ft, 2 Oct. 1906, *Pringle 10068 1/2* (MICH, US).

The characters by which *T. oligantha* differs from the closely related *T. accedens* are enumerated in Table 1. Most of these are minor, but it may be noted that the very narrow heads of *T. oligantha*, with 10 florets, in contrast to the more broadly campanulate heads of *T. accedens*, with 30-40 florets, provide a ready means for distinguishing the two species.

Powell (1965) has suggested that *T. accedens* might possibly link *Tridax* with *Galinsoga*. *Tridax oligantha* might thus appear to provide an even closer approach to that genus. But neither species actually bridges the gap between *Tridax* and *Galinsoga*. Among the characters which ally *T. oligantha* to *Tridax* rather than to *Galinsoga* are the corollas longer than 3 mm, anthers 1.8 mm long, the elongate, appendiculate style branches, and the narrowly obconical, densely pubescent achenes (see Powell, 1965, p. 47 for a tabulation of differences between *Tridax* and *Galinsoga*). The narrow heads might seem to relate it to *Galinsoga*, but the heads are narrow as a result of the few florets. Other species of both *Tridax* and *Galinsoga* have more numerous florets per head. In all aspects except width, the heads of *T. oligantha* are much more similar to *T. accedens* than to any species of *Galinsoga*. Generic status for *T. oligantha* might be argued on the basis of its epappose and eligulate features, but there are other epappose forms in both *Tridax* and *Galinsoga*, and several eligulate species, including *T. accedens*, are known in *Tridax*.

Tridax dubia, *T. accedens*, and *T. oligantha*, respectively, appear to form an evolutionary reduction series. The largest plants, perennial in duration, occur in *T. dubia*, while *T. accedens* and *T. oligantha* are smaller annuals. The heads of *T. dubia* and *T. accedens* have 30-40 florets while those of *T. oligantha* are reduced to 10. Ray florets are present in *T. dubia* and absent in *T. accedens* and *T. oligantha*. The corollas of the disk florets are longer in *T. dubia* than in the other two species. The pappus is longest

in *T. dubia*, shorter in *T. accedens*, and absent in *T. oligantha*. Although *T. dubia* is the basic species in this evolutionary line, it is probably not a very primitive member of the genus.

The morphological similarities of these three species are paralleled by their geographic relationships. Each has a localized distribution on the Pacific slope of southwestern Mexico. *Tridax dubia* occurs near sea level in Colima, Jalisco, and Nayarit at the northwest end of an axis that extends southeast and east through Michoacán to northern Guerrero. *Tridax accedens* occupies an intermediate geographic position, being known only from Coalcoman, Michoacán at an altitude of ca 1000 m. The easternmost member of the three, *T. oligantha*, occurs at about the same altitude as *T. accedens*, and is localized in the Iguala-Chilpancingo region of Guerrero. McVaugh and Rzedowski (1965) have noted that endemism is frequent in southwestern Mexico, and a number of the species of *Bursera* which they studied have distributions corresponding to these species of *Tridax*. In contrast to the evident phytogeographic relationship of *T. oligantha* when associated with *T. accedens* and *T. dubia*, it has no geographic connection with *Eleutheranthera*. The latter is widely distributed in tropical America but has not been reported from Mexico.

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